REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Claim Amendments

Claim 7 has been amended to recite that the temperature sensitive element is produced at the same time the indium is included in the carbon nanotube. Support for this amendment is found on page 9, lines 19-23 of Applicants' specification.

Claim 17 has been amended to make a minor change of an editorial nature.

No new matter has been added to the application by these amendments.

Consideration After Final Rejection

Although this amendment is presented after final rejection, the Examiner is respectfully requested to enter the amendments and consider the remarks, as they place the application in condition for allowance.

Patentability Arguments

The patentability of the present invention over the disclosures of the references relied upon by the Examiner in rejecting the claims will be apparent upon consideration of the following remarks.

Rejection Under 35 U.S.C. § 103(a)

The rejection of claims 7-12 and 17-27 under 35 U.S.C. § 103(a) as being unpatentable over Gao et al. in view of Boyer (U.S. 1,793,303) is respectfully traversed.

The Examiner takes the position that Gao et al. disclose a process for producing a temperature sensitive element, comprising mixing gallium oxide powder and carbon powder into a uniform state, subjecting the powder to heating treatment at 1360°C under inert gas flow, thus vaporizing the mixture, and causing the vapor to react at a temperature of 800°C. The Examiner admits that Gao et al. do not disclose the use of indium oxide powder.

The Examiner asserts that Boyer discloses a temperature responsive device, which uses gallium or indium as temperature sensing materials. The Examiner takes the position that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Gao by using indium instead of gallium, as taught by Boyer, when making the oxide for the temperature sensitive composition disclosed by Gao et al., because Boyer teaches that the metals are equivalent.

The Examiner further admits that Gao et al. fail to teach that the heating treatment is conducted for one hour or more. The Examiner takes the position that this limitation, absent any criticality, is considered to be the optimum amount of time for conducting the heating treatment used by Gao et al.

However, as discussed above, Applicants have amended independent claim 7 to clarify that the temperature sensitive element is produced at the same time the indium is included in the carbon nanotube. For the sake of argument, it may be possible that a method for producing a temperature sensitive element comprising the steps of preparing a carbon nanotube in advance, and then inserting indium into the carbon nanotube, could be considered anticipated or obvious for a skilled person in the art. However, this is not what is claimed in the present application. Rather, the temperature sensitive element of the presently claimed invention is produced at the same time the indium is included in the carbon nanotube. One of ordinary skill in the art would not arrive at this invention from the teachings of the cited references, because one cannot predict whether such temperature sensitive element can actually be produced in one synthesis, absent conducting the actual experiment. Even though indium and gallium may both be considered temperature sensing materials, this does not mean that a process which would be successful with gallium would also be successful with indium. There is no reasonable expectation of success, particularly because the interfacial tension of indium is different from that of gallium.

Additionally, a temperature sensitive element using indium has the following advantages, which are not taught or suggested by either of the cited references, taken alone or in combination. Indium, when used for a nanothermometer, has the advantage of measuring temperature in a short time, because heat conducts in indium quickly due to

its larger thermal conductivity when compared to gallium. Furthermore, since the coefficient of thermal expansion of indium is larger than that of gallium, the unit scale of the indium nanothermometer can be made larger that that of gallium nanothermometer. The indium nanothermometer also has the advantage of having an easy to read scale. Additionally, the price of the material for producing a nanothermometer is important for producing the same as industrial products. The price of indium is about a quarter of the price of gallium. Thus, the temperature sensitive element produced by Applicants' recited process is superior to the teachings of the cited references.

Applicants also note that this invention was granted in Japan as Japanese Patent No. 3,921,533 on March 2, 2007. This recently granted patent provides further evidence that the presently claimed invention is patentable over the relevant art, and should issue as a patent.

For these reasons, the invention of claims 7-12 and 17-27 is clearly patentable over Gao et al. in view of Boyer.

Conclusion

Therefore, in view of the foregoing amendments and remarks, it is submitted that the ground of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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